west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304-2345
Phone: 304 926 0475 • Fax: 304 926 0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION/FACT SHEET

B ACKGROUND INFORMATION

Application No.:	R13-3065
Plant ID No.:	051-00159
Applicant:	Elementis Specialties, Inc.
Facility Name:	New Martinsville Industrial Park (Bayer New Martinsville)
Location:	New Martinsville
NAICS Code:	325199
Application Type:	Modification
Received Date:	April 8, 2013
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	$1000.00
Date Received:	April 10, 2013
Complete Date:	December 26, 2013
Due Date:	March 26, 2014
Applicant Ad Date:	April 10, 2013
Newspaper:	*Wetzel Chronicle*
UTM's:	Easting: 514.6 km Northing: 4,397.3 km Zone: 17
Description:	The application is for Phase II of specialty chemical manufacturing operation.

PROJECT BACKGROUND

Elementis Specialties, Inc. (Elementis) is proposing to construct a new batch-type specialty multi-product chemical manufacturing operation in New Martinsville, Wetzel County, West Virginia. This operation will be located in an existing facility previously occupied by Bayer Material Science (Bayer) in the New Martinsville Industrial Park on State Route 2 North. Elementis is leasing this site from Bayer, which is responsible for providing all of the utilities to Elementis under a landlord tenant agreement.

Elementis installed Phase I process equipment to produce a family of rheological products at the site during 2012, which was filed as Permit Determination PD12-068, dated August 8, 2012. At that time, it was determined that Phase I did not required a permit under 45 CSR 13 (West Virginia's Minor Source Air Permitting Program).

In Phase 2 of the proposed manufacturing operations at the facility, Elementis will be installing new process equipment to produce HASE (a proprietary hydrophobiclly modified alkali swellable emulsion) and Dispersant products. The Phase 2 process equipment will not only produce new products but also increase the facility's capacity for producing existing products.

DESCRIPTION OF PROCESS

Production of the various products follows essentially the same steps. As an example, the production process for Nuosperse® FX 665 a is describe below

A vacuum is pulled and released with nitrogen within the reactor prior to charging the reactor with toluene from a tote. Di-isobutylene and maleic anhydride are then charged in separate steps to the reactor. The batch is sparged with nitrogen and then heated. The reactor is charged with 2,2'-azodi(iso-butyronitrile) and then mixed for a specified time period. The batch is cooled, and then water and other materials are added and mixed. The batch is settled and cooled. The water layer is transferred to a storage tank prior to the toluene layer being transferred to a solvent recovery tank. The batch in the storage tank is transferred back to the reactor, heated, refluxed, and cooled after which it will subsequently be transferred to a storage tank.

SITE INSPECTION

On May 8, 2013 the writer visited the site. Mr. Scott Anderson, Plant Manager for Elementis, and Charlie Racer, Elementis Site Contact, accompanied the writer during this visit. The proposed location of this phase will be right next to Phase I. Elementis is only using one existing tank from Bayer. This vessel is a horizontal storage tank with a capacity of 70,000 liters and identified as T-251. Elementis will be using it to hold caustic for the process. All other storage vessels and process equipment will be new equipment.

There were no signs of pre-construction or emission units other than what has been disclosed in the application and Permit Determination PD12-068. The writer has no issues with the actual site with regards to the proposed process.

ESTIMATE OF EMISSION BY REVIEWING ENGINEER

Elementis used Emission Master© 8.1.0.14, which is an emission estimating program developed by Mitchell Scientific, to predict the potential releases from the two new processes, which are the HASE and Dispersants. The program features an interactive chemical database that supports several vapor pressure model using Antoine, Clapeyron, and Riedel equations, and allows modeling of multi-phase liquid mixtures, which estimates volatile organic compound (VOC) and Hazardous Air Pollutants (HAPs) emissions. Unit operations include Empty Vessel Purge,

Vacuum Operation, Solids Drying, Holding, Filling, Purging, Heating, Depressurization, Gas Evaluation, Reaction, and Fixed Roof Storage Tanks.

The batch size, cycle time, and estimated production rate of these products were used in determining these emissions. The HASE and Dispersants units could be operated independent of each other. The products that Elementis has proposed to manufacture yield different VOC and HAP emission rates. These rates range from just over a tenth of pound per batch to nearly 17 pounds per batch. Because the batch times vary from type of product, the total emissions per batch were divided by the projected batch time to determine an average emission rate per product. The highest emission yielding HASE and Dispersant products were added together which comes out to be 1.17 pounds of VOCs per hour and 1.01 pounds of HAPs per hour. Elementis provided an estimate of annual emission rate which was based on forecasted sales of certain products over a year. The applicant's approach yielded a potential of 1.6 tons of VOC emissions per year and of this amount 1.3 tons would be classified as hazardous air pollutants. Elementis proposed applying a margin of compliance (factor of safety) factor to the annual estimate of 6.

The applicant's suggested factor only addresses annual emissions and really only allowed the facility the flexibility to change the number of batches of the proposed products. This approach would not give any flexibility or account for any variability in the short term estimates. The writer proposed taking the worst VOC emitting products from each production line in terms of lb/hr and applying a factor of 2 to this hourly rate (1.17 lb of VOC/hr *2 = 2.34). This hourly rate is then annualizing on the maximum operating schedule possible which potentially yielded a VOC of 10.3 tons per year. The corresponding HAP potential is 2.02 lb/hr and 8.9 tons per year.

The applicant's estimates were developed using good engineering practices and realistic to actual emissions. However, it would unnecessarily cause the agency to develop limitations that may restrict the manufacturing operation or be unreasonable to comply with.

REGULATORY APPLICABLILITY

Elementis would be required to comply with regulations promulgated by the U.S. Environmental Protection Agency (EPA) and the West Virginia Department of Environmental Protection (Department) with respect to emissions of air contaminants. This section evaluates the applicability of federal and state air quality regulations to the proposed project.

U.S. ENVIRONMENTAL PROTECTION AGENCY REGULATIONS

EPA currently regulates sources of air contaminants through four major programs potentially relevant to this application:

1) New Source Performance Standards (NSPS)
2) National Emission Standards for Hazardous Air Pollutants (NESHAP)

3) Maximum Achievable Control Technology (MACT) and Generally Available Control Technology (GACT) for Source Categories
4) Prevention of Significant Deterioration (PSD)/Nonattainment New Source Review (NNSR)

New Source Performance Standards

The NSPS regulations currently apply to numerous categories of sources. These standards typically impose emission limitations and operating requirements specific to each source category. A number of the following NSPS rules promulgated in 40 CFR Part 60 have potential applicability to the proposed project. The applicability of each rule is evaluated below.

Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units – This rule applies to boilers rated between 10 and 100 MMBTU/hr that were installed after June 9, 1989. Elementis will not be installing any boilers at the facility. Therefore, this rule does not apply.

Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 – This rule applies to storage tanks with capacities of at least 75 cubic meters (19,800 gallons) that contain volatile organic liquids. However, the rule exempts tanks meeting either of the following conditions:

- Tanks greater than 151 cubic meters (39,900 gallons) containing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) (26.3 mm Hg); or

- Tanks between 75 and 151 cubic meters containing a liquid with a maximum true vapor pressure less than 15 kPa (112.5 mm Hg).

The largest VOC storage tank at the facility is a 50,000-liter acrylic acid tank (50 cubic meters). Therefore, there are no tanks meeting the applicability criteria, and this rule does not apply. There are larger vessels associated with this construction project that have been selected to store inorganic compounds and thus are not subject to this regulation.

Subpart DDD - Standards of Performance for VOC Emissions from the Polymer Manufacturing Industry – This rule applies to facilities manufacturing one or more of the following polymers: polypropylene, polyethylene, polystyrene, or poly (ethylene terephthalate). Since the proposed project will not manufacture any of these compounds, this rule does not apply.

Subpart RRR - Standards of Performance for Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes – This rule applies to facilities that manufacture one or more of 176 listed chemicals as a product, co-product, by-product, or intermediate. None of the products to be produced by Elementis are listed chemicals. Therefore, this rule does not apply.

Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines – This rule applies to stationary compression (diesel-fired) engines manufactured after April 1, 2006. Elementis will not be installing any diesel-fired engines. Therefore, this rule does not apply.

Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines – This rule applies to stationary spark ignition (gas-fired engines) constructed after June 12, 2006. Elementis will not be installing any gas-fired engines. Therefore, this rule does not apply.

Subpart VV - Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006 – This rule applies to equipment leaks from SOCMI sources that commenced operation before November 7, 2006. The Elementis operation is not part of the SOCMI and was installed after November 7, 2006. Therefore, this rule does not apply.

Subpart NNN - Standards of Performance for Volatile Organic Compound (VOC) Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations – This rule applies to SOCMI distillation operations that produce one or more listed chemicals. The Elementis operation is not part of the SOCMI and does not produce any of the listed chemicals. Therefore, this rule does not apply.

Subpart RRR - Standards of Performance for Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes – This rule applies to SOCMI reactor operations that produce listed chemicals. The Elementis operation is not part of the SOCMI and does not produce any of the listed chemicals. Therefore, this rule does not apply.

National Emission Standards for Hazardous Air Pollutants

The NESHAP regulations apply to the following compounds listed as hazardous air pollutants (HAPs) prior to the passage of the Clean Air Act Amendments of 1990 (CAAA): asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride. The regulations list emission limits, operating parameters, and other requirements that must be followed for specifically listed source types that emit these compounds. NESHAP regulations do not apply to this application because the new operation will not emit any of these air contaminants.

Maximum Achievable Control Technology and Generally Available Control Technology Standards

Historically, MACT standards have been promulgated for numerous categories of major HAP sources (those with potential emissions of 10 or more tons per year of any individual HAP or 25

tons per year of combined HAPs). EPA has recently begun promulgating Generally Available Control Technology (GACT) standards for area (minor) sources of HAPs. MACT and GACT standards typically impose emission limitations; operating practices; and monitoring, recordkeeping, and reporting requirements on affected facilities. Based on a review of HAP emission data, the proposed operation will be a natural minor (area) HAP source. The following area source GACT standards promulgated in 40 CFR Part 63 have potential applicability to this project for area sources.

Area Source GACT Rules – The following rules are applicable to area (minor) HAP sources:

Subpart DDDDDD – National Emission Standards for Hazardous Air Pollutants for Polyvinyl Chloride and Copolymers Production Area Sources – This rule applies to facilities that manufacture PVC or copolymers. Elementis will not manufacture either of these chemicals. Therefore, this rule will not apply.

40 CFR 63, Subpart JJJJJJ, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers: Area Sources – This rule applies to new and existing boilers located at area HAP sources. Elementis will not be installing any boilers. Therefore, this rule will not apply.

Subpart VVVVVV – National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources – This rule applies to chemical manufacturing process units (CMPUs) at area HAP sources that use or produce 1,3-butadiene; 1,3-dichloropropene; acetaldehyde; chloroform; ethylene dichloride; hexachlorobenzene; methylene chloride; quinoline; arsenic compounds; cadmium compounds; chromium compounds; lead compounds; manganese compounds; nickel compounds; and hydrazine. None of these chemicals will be used or produced at the new operation. Therefore, this rule does not apply.

Subpart BBBBBBB – National Emission Standards for Hazardous Air Pollutants for Area Sources: Chemical Preparations Industry – This rule applies to chemical preparations facilities at area HAP sources with at least one chemical preparations operation described by NAICS Code 325998 in target HAP service (defined as compounds of chromium (VI), lead, or nickel in amounts greater than or equal to 0.1 percent by weight (as the metal), or manganese or chromium (III) compounds in amounts greater than or equal to 1.0 percent by weight (as the metal). Specifically, "chemical preparation" is defined as "a target HAP-containing product, or intermediate used in the manufacture of other products, manufactured in a process operation described by the NAICS code 325998 if the operation manufactures target HAP-containing products or intermediates other than indelible ink, India, ink, writing ink, and stamp pad ink." Elementis will not process any of the listed HAPs. Therefore, this rule does not apply.

Subpart CCCCCCC – National Emission Standards for Hazardous Air Pollutants for Area Sources: Paints and Allied Products Manufacturing – This rule applies to area HAP sources engaged in the manufacture of paints and allied products, defined as follows:

> *Paints and allied products manufacturing* means the production of paints and allied products, the intended use of which is to leave a dried film of solid material on a substrate. Typically, the manufacturing processes that produce these materials are described by Standard Industry Classification (SIC) codes 285 or 289 and North American Industry Classification System (NAICS) codes 3255 and 3259 and are produced by physical means, such as blending and mixing, as opposed to chemical synthesis means, such as reactions and distillation. Paints and allied products manufacturing does not include:
>
> (1) The manufacture of products that do not leave a dried film of solid material on the substrate, such as thinners, paint removers, brush cleaners, and mold release agents;
>
> (2) The manufacture of electroplated and electroless metal films;
>
> (3) The manufacture of raw materials, such as resins, pigments, and solvents used in the production of paints and coatings; and
>
> (4) Activities by end users of paints or allied products to ready those materials for application
>
> The new operation will manufacture raw materials to be used in the production of coatings, not the coatings themselves. Therefore, this rule does not apply.

Subpart H - National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks – This rule applies only if referenced by another Subpart of Part 63 that is applicable. There are no applicable Part 63 rules that apply to Elementis. Therefore, Subpart H does not apply.

Subpart TT - National Emission Standards for Equipment Leaks-Control Level 1 – This rule applies only if referenced by another Subpart of Part 63 that is applicable. There are no applicable Part 63 rules that apply to Elementis. Therefore, Subpart TT does not apply.

Subpart UU - National Emission Standards for Equipment Leaks-Control Level 2 – This rule applies only if referenced by another Subpart of Part 63 that is applicable. There are no applicable Part 63 rules that apply to Elementis. Therefore, Subpart TT does not apply.

Prevention of Significant Deterioration of Air Quality (PSD)

The purpose of the PSD rules is to maintain air quality in areas that are meeting the National Ambient Air Quality Standards. Marshal County is an attainment area for all criteria pollutants except for $PM_{2.5.}$ Chemical process plants, which include Elementis' operations, are one of the 28 listed source categories for which the major source threshold is 100 ton/yr. Since the emissions of all pollutants from the new project will be well below this threshold, the PSD rules will not apply.

Nonattainment New Source Review (NNSR)

The NNSR regulations apply in nonattainment areas, i.e., areas that are not meeting the National Ambient Air Quality Standards (NAAQS) for one or more air contaminants. The purpose of the NNSR regulations is to allow for industrial and economic growth in nonattainment areas while progressing toward the attainment of NAAQS. Marshal County is a non-attainment area for $PM_{2.5}$. Therefore, the NNSR rules might apply.

NNSR applies to major sources as defined in 45 CSR 19. Major source is one that emits or has the potential to emit 100 tons per year of the pollutant that the area is in not achieving the NAAQS. The proposed units would not emit any $PM_{2.5.}$ Therefore, Elementis is not a major source and is not subject to NNSR for this project.

Mandatory Greenhouse Gas Reporting Rule

On October 30, 2009, EPA promulgated the final greenhouse gas (GHG) reporting rule (40 CFR Part 98). Facilities meeting both of the following conditions are required to submit annual reports of CO_2, N_2O, and CH_4 emissions to EPA:

- The rated heat input to all stationary fuel combustion equipment (including boilers and thermal oxidizers, but not emergency equipment), exceeds 30 MMBTU/hour; and

- The actual GHG emissions exceed 25,000 metric tons per year, as CO_2 equivalent.

Elementis will not be installing any combustion sources or other sources that may emitted GHG emissions at the New Martinsville facility. Therefore, this rule will not apply.

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REGULATIONS

The applicability of the West Virginia regulations to the proposed project is discussed below.

Rule 2, Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers – The operation will not have any fuel combustion in indirect heat exchangers.

Rule 7, To Control Particulate Matter Air Pollution from Manufacturing Processes and Associated Operations – Since the proposed operation will process only liquid raw materials, no particulate emissions are expected. In addition, the processing units will not use or manufacture mineral acids as part the proposed manufacturing process. Technically the units are subject to

the process weight standards and would meet the standard without the use of any add on controls.

Rule 10, To Prevent and Control Air Pollutions from the Emission of Sulfur Oxides – The facility will not combust any fuels, so no sulfur oxide emissions are expected. Therefore, units are not subject to the emission standards of this rule.

Rule 13, Permits for Construction, Modification, Relocation Updates, Temporary Permits, General Permits, and Procedures for Evaluation – Pursuant to §45-13-2.17, Elementis is required to obtain a New Source Review permit because it is modifying an existing source and the:

(i) Potential emission rates of criteria pollutants exceed 6 lb/hr, or 144 lb/day, or 10 ton/yr;

(ii) Potential emission rates of hazardous air pollutants (HAPs) exceed 2 lb/hr or 5 ton/yr;

As a result, the applicant provided a complete application, paid the filling fee in accordance with Rule 22, and published a Class I legal Ad in accordance with §13-8.3.

Rule 16, Standards of Performance for New Stationary Sources – WV DEP adopts and incorporates by reference the federal New Source Performance Standards (NSPS) promulgated by the U.S. EPA. As discussed above, Elementis will not be subject to any NSPS rules.

Rule 21, Regulation to Prevent and Control Air Pollution from the Emission of Volatile Organic Compounds – Elementis proposed site is not located with one of the identified counties in 45 CSR §21-1.1., which are Putnam, Kanawha, Cabell, Wayne, and Wood Counties. Thus, none of the proposed emission sources would be subject to this rule.

Rule 27, To Prevent and Control the Emissions of Toxic Air Pollutants – This regulation requires the implementation of Best Available Technology (BAT) for sources emitting one or more listed toxic air pollutants. Elementis will not be processing or emitting any of the TAPs listed in 45 CSR §27-2.10.

Rule 29, Rule Requiring the Submission of Emission Statements for Volatile Organic Compound Emissions and Oxides of Nitrogen Emissions – Elementis will not be required to submit emission statements because it is located in Marshal County (not one of the counties listed in §45-29-1.1) and because VOC emissions will be less than 25 tons per year.

Rule 30, Requirements for Operating Permits – Elementis will not be required to obtain an operating permit because it is not a major source, is not subject to Section 111 or 112 of the Clean Air Act, and is not an affected facility subject to Title IV of the Clean Air Act (Acid Deposition Control).

Rule 34, Emission Standards for Hazardous Air Pollutants – WV DEP adopts and incorporates by reference the National Emission Standards for Hazardous Air Pollutants (NESHAP)

promulgated by the EPA. As discussed above, Elementis will not be subject to any NESHAP rules.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Acrylic Acid, ethyl acrylate, styrene, toluene, and vinyl acetate are non-criteria regulated pollutants which will be emitted from the proposed units. However, none of these pollutants either individually nor in total will be emitted in an amount that would trigger any additional regulations.

AIR QUALITY IMPACT ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed construction does not meet the definition of a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

The writer recommends the following monitoring requirements:

- Record the monthly and total production rates by product and number of batches from production unit;
- Record the amount of basic feed stock materials consumed on monthly basis;
- Determine VOC and total HAP emissions for each calendar month using mass balance and/or engineering calculations.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed modification of the facility will meet all the requirements of the application rules and regulations when operated in accordance to the permit application. Therefore, this writer recommends granting Elementis Specialties Inc. a Rule 13 construction permit for their specialty chemical production facility located at the New Martinsville Industrial Park near New Martinsville, WV.

Edward S. Andrews, P.E.
Engineer

April 1, 2014
Date